CONSTRUCTION SPECIFICATION

MI-154. EARTHFILL

1. SCOPE
The work shall consist of placing the earthfill required by the drawings and specifications.

2. TIMING
Construction work covered by this specification shall not be performed between November 15 and the following April 15 unless the site conditions and/or the construction methods to be used have been reviewed and approved in writing by the NRCS inspector.

3. MATERIALS
All fill materials shall be obtained from required excavations and designated borrow areas. The selection of fill materials shall be subject to approval by the NRCS inspector.

Fill materials shall not contain sod, roots, frozen soil, snow or ice, or other perishable materials. Stones larger than 6 inches (150 mm) in diameter shall be removed prior to compaction of the fill.

The type of materials that are acceptable shall be as listed and described in the drawings.

4. FOUNDATION PREPARATION
Foundations for earthfill shall be stripped to remove vegetation and other unsuitable materials. Earth foundation surfaces shall be graded to remove surface irregularities and scarified to a depth of not less than 2 inches (50 mm).

5. PLACEMENT
Fill shall not be placed upon a frozen surface.

Earthfill in dams, dikes and other structures designed to restrain the movement of water shall be placed so as to meet the following additional requirements:

a. The distribution of materials throughout each zone shall be essentially uniform, and the fill shall be free from lenses, pockets, streaks or layers of material differing substantially in texture, moisture content or gradation from the surrounding material.

b. If the surface of any layer becomes too hard and smooth to achieve a suitable bond with the succeeding layer, it shall be scarified parallel to the axis of the fill to a depth of not less than 2 inches (50 mm) before the next layer is placed.

c. The top surfaces of embankments shall be maintained approximately level during construction, except that a crown or cross-slope of approximately 2 percent shall be maintained to ensure effective drainage.

d. Dam and dike embankments shall be constructed in continuous layers from abutment to abutment, except where openings to facilitate construction or to allow passage of stream flow during construction are specified.

6. CONTROL OF WATER CONTENT
The fill material shall have a water content sufficient to secure compaction. When kneaded in the hand, it will form a ball that does not readily separate when struck sharply with a pencil and will not extrude out of the hand when squeezed tightly.

If the top surface of the preceding layer of compacted fill or a foundation or abutment surface in the zone of contact with the fill becomes too dry to permit suitable bond, it shall either be removed or scarified and wetted by sprinkling to an acceptable water content prior to placement of the next layer of fill.

If the top surface of the preceding layer of compacted fill or a foundation or abutment surface in the zone of contact with the fill becomes too slick or saturated, it shall be allowed to dry and shall be thoroughly scarified to a depth of not less than 2 inches (5 cm) before placing additional layers of fill.

7. COMPACTION

Fill materials adjacent to structures shall be placed and spread in layers not over 4 inches (100 mm) thick before compaction. Fill materials adjacent to structures shall be manually tamped in a manner that will prevent damage to the structures.

The methods of compaction listed below are intended to achieve at least 90 percent of the maximum density as determined by the Standard Proctor Test, ASTM D 698. All fill materials, not placed adjacent to structures, shall be placed and spread in layers not over 9 inches (230 mm) thick before compaction. Each layer shall be compacted by traversing the entire surface using one of the following methods:

a. Tamping (Sheepsfoot) Roller - Minimum of 4 passes with contact pressure of at least 100 pounds per square inch (700 kPa), towed at speeds not exceeding 5 miles per hour (8 km/h).

b. Pneumatic (Rubber Tire) Roller - Minimum of 4 passes with a wheel load of at least 18,000 pounds and a tire pressure of 80 psi (560 kPa), towed at speeds not exceeding 5 mph (8 km/h).

c. Loaded Earth Moving Equipment - Minimum of 4 passes with a wheel load of at least 10 psi (70 kPa), towed at speeds not exceeding 5 mph (8 km/h). The following limitations apply to this method:

(1) Fill height shall be less than 6 feet (1.8 m).
(2) Fill shall not have more than a 3 foot depth of permanent water stored against it, or the effective width of the fill at the elevation of the permanent water shall be a minimum of 100 feet.

d. Wheel Type Tractor (Farm Tractor) - Minimum of 4 passes with a wheel type tractor (minimum 100 horsepower (75 kW) exerting a pressure of not less than 10 psi (70 kPa). Tractor speeds shall not exceed 5 mph (8 km/h) during compaction process. The following limitations apply to this method:

(1) Fill height shall be less than 6 feet (1.8 m).
(2) Fill shall not have more than a 3 foot depth of permanent water stored against it, or the effective width of the fill at the elevation of the permanent water shall be a minimum of 100 feet.

e. Track Type Tractor (Crawler. Bulldozer) - Minimum of 4 passes with a track type tractor exerting a pressure of not less than 8 psi (56 kPa). Tractor speeds shall not exceed 5 mph (8 km/h) during compaction process. The following limitations apply to this method:

(1) Maximum loose lift thickness of 6 inches (150 mm). Stones larger than 3 inches (75 mm) in diameter shall be removed prior to compaction.
(2) Fill height shall be less than 6 feet (1.8 m).
(3) Fill shall not have more than a 3 foot depth of permanent water stored against it, or the effective width of the fill at the elevation of the permanent water shall be a minimum of 100 feet.